

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims**

1           Claim 1 (previously presented): An injection molding system comprising:  
2           an injection molding apparatus injecting melted resin into a die, the die  
3           being placed forward of one end of the injection molding apparatus;  
4           an air feeder for feeding at least air into the injection molding apparatus  
5           through a mouth arranged at an end of the injection molding apparatus opposite  
6           to the one end of the injection molding apparatus;  
7           a resin pellet feeding passage for feeding resin pellets into the injection  
8           molding apparatus, the resin pellet feeding passage feeding the pellets into the  
9           injection molding apparatus at a location spaced apart from where the mouth  
10          feeds the at least air into the injection molding apparatus;  
11          a pellet feeding regulator for controlling a feed of the resin pellets from the  
12          resin pellet feeding passage into the injection molding apparatus;  
13          a pellet exhaust gas passage for passing moisture and exhaust gas which  
14          are generated when the resin pellets melt in the injection molding apparatus; and

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

15 a decompressor connected to the exhaust gas passage for exhausting the  
16 moisture and the exhaust gas from a pellet feeding passage side to an outside  
17 of the injection molding apparatus.

1 Claim 2 (currently amended): An injection molding system comprising:  
2 an injection molding apparatus;  
3 an air feeder for feeding at least air to the injection molding apparatus;  
4 a resin pellet feeding passage for feeding resin pellets into the injection  
5 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
6 injection molding apparatus at a location spaced apart from where the mouth  
7 feeds the at least air into the injection molding apparatus;

8 a pellet feeding regulator for controlling a feed of the resin pellets from the  
9 resin pellet feeding passage into the injection molding apparatus;

10 ~~a pellet exhaust gas passage for passing moisture and exhaust gas which~~  
11 ~~are generated when the resin pellet melt in the injection molding apparatus; and~~

12 a decompressor connected to the exhaust gas passage for exhausting the  
13 moisture and the exhaust gas from the pellet feeding passage side to the outside  
14 of the injection molding apparatus, and moisture and exhaust gas which are  
15 generated in a die.

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

1 Claim 3 (previously presented): An injection molding system comprising:  
2 an injection molding apparatus injecting melted resin into a die, the die  
3 being placed forward of one end of the injection molding apparatus;  
4 an air feeder for feeding at least air into the injection molding apparatus  
5 through a mouth arranged at an end of the injection molding apparatus opposite  
6 to the one end of the injection molding apparatus;  
7 a resin pellet feeding passage for feeding resin pellets into the injection  
8 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
9 injection molding apparatus at a location spaced apart from where the mouth  
10 feeds the at least air into the injection molding apparatus;  
11 a pellet feeding regulator for controlling a feed of the resin pellets from the  
12 resin pellet feeding passage into the injection molding apparatus;  
13 a pellet exhaust gas passage for passing moisture and exhaust gas which  
14 are generated when the resin pellets melt in the injection molding apparatus;  
15 a decompressor connected to the exhaust gas passage for exhausting the  
16 moisture and the exhaust gas from a pellet feeding passage side to an outside  
17 of the injection molding apparatus; and  
18 a device for preventing the moisture and the exhaust gas which pass  
19 through the gas exhaust passage from contacting the resin pellets passing  
20 through the pellet feeding passage, with the moisture and the exhaust gas

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

21 passing through a space outside the pellet feeder.

1 Claim 4 (previously presented): An injection molding system comprising:  
2 an injection molding apparatus injecting melted resin into a die, the die  
3 being placed forward of one end of the injection molding apparatus;  
4 an air feeder for feeding at least air into the injection molding apparatus  
5 through a mouth arranged at an end of the injection molding apparatus opposite  
6 to the one end of the injection molding apparatus;  
7 a resin pellet feeding passage for feeding resin pellets into the injection  
8 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
9 injection molding apparatus at a location spaced apart from where the mouth  
10 feeds the at least air into the injection molding apparatus;  
11 a pellet feeding regulator for controlling a feed of the resin pellets from the  
12 resin pellet feeding passage into the injection molding apparatus;  
13 a pellet exhaust gas passage for passing moisture and exhaust gas which  
14 are generating when the resin pellets melt in the injection molding apparatus;  
15 a decompressor connected to the exhaust gas passage for exhausting the  
16 moisture and the exhaust gas from a pellet feeding passage side to an outside  
17 of the injection molding apparatus; and  
18 a removing apparatus placed at the exhaust gas passage.

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

1 Claim 5 (currently amended): An injection molding system comprising:  
2 an injection molding apparatus;  
3 an air feeder for feeding at least air to the injection molding apparatus;  
4 a resin pellet feeding passage for feeding resin pellets into the injection  
5 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
6 injection molding apparatus at a location spaced apart from where the mouth  
7 feeds the at least air into the injection molding apparatus;  
8 a pellet feeding regulator for controlling a feed of the resin pellets from the  
9 resin pellet feeding passage into the injection molding apparatus;  
10 ~~an exhaust gas passage for passing moisture and exhaust gas which are~~  
11 ~~generated when the resin pellets melt in the injection molding apparatus;~~  
12 a decompressor connected to the exhaust gas passage for exhausting the  
13 moisture and the exhaust gas from a pellet feeding passage side to an outside  
14 of the injection molding apparatus; and  
15 a detector for detecting an accumulation amount of the resin pellets  
16 situated inside a cylinder of the injection molding apparatus.

1 Claim 6 (currently amended): An injection molding system comprising:  
2 an injection molding apparatus;

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

3           an air feeder for feeding at least air to the injection molding apparatus;  
4           a resin pellet feeding passage for feeding resin pellets into the injection  
5           molding apparatus, the resin pellet feeding passage feeding the pellets into the  
6           injection molding apparatus at a location spaced apart from where the mouth  
7           feeds the at least air into the injection molding apparatus;  
8           a pellet feeding regulator for controlling a feed of the resin pellets from the  
9           resin pellet feeding passage into the injection molding apparatus;  
10           ~~an exhaust gas passage for passing moisture and exhaust gas which are~~  
11           ~~generated when the resin pellets melt in the injection molding apparatus;~~  
12           a decompressor connected to the exhaust gas passage for exhausting the  
13           moisture and the exhaust gas from a pellet feeding passage side to an outside  
14           of the injection molding apparatus;  
15           ~~a detector for detecting an accumulation amount of the resin pellets~~  
16           ~~situated inside a cylinder of the injection molding apparatus;~~  
17           a device for preventing the moisture and the exhaust gas which pass  
18           through the exhaust gas passage from contacting with the resin pellets passing  
19           through the pellet feeding passage; and  
20           a removing apparatus placed at the exhaust gas passage.

1           Claim 7 (original): The injection molding system of claim 1, 2, 3, 4, 5 or

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

6, wherein the degree of decompression of said decompressor is about 40Kpa  
(300 torr) or more.

Claim 8 (original): The injection molding system of claim 7, wherein the  
degree of compression is about 70 Kpa or more.

Claim 9 (original): The injection molding system of claim 7, wherein the  
degree of compression is about 80 Kpa to 95 Kpa.

Claim 10 (original): The injection molding system of claim 5 or 6, wherein  
said detector is situated within about 10 mm from an upper end of a flight of a  
screw inside the cylinder.

Claim 11 (previously presented): A resin pellet feeding unit comprising:  
a device for automatically feeding pellets with a vacuum interception  
valve, the device and the valve being disposed to intercept a passage between  
a pellet storage tank and other pellet storage;  
a resin pellet feeding passage for feeding resin pellets into an injection  
molding apparatus;  
a pellet feeding regulator for controlling a feed of the resin pellets from the

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

8 resin pellet feeding passage into the injection molding apparatus;  
9 an exhaust gas passage for passing moisture and exhaust gas which are  
10 generated when the resin pellets melt in the injection molding apparatus; and  
11 a decompressor connected to the exhaust gas passage for exhausting the  
12 moisture and the exhaust gas from a pellet feeding passage side to an outside  
13 of the injection molding apparatus.

1 Claim 12 (previously presented): A resin pellet feeding unit comprising:  
2 a device for automatically feeding pellets with a vacuum interception valve,  
3 the device and the valve being disposed to intercept a passage between a pellet  
4 storage tank and other pellet storage;  
5 a resin pellet feeding passage for feeding resin pellets into an injection  
6 molding apparatus;  
7 a pellet feeding regulator for controlling feed of the resin pellets from the  
8 resin pellet feeding passage into the injection molding apparatus;  
9 an exhaust gas passage for passing moisture and exhaust gas which are  
10 generated when the resin pellets melt in the injection molding apparatus;  
11 a decompressor connected to the exhaust gas passage for exhausting the  
12 moisture and the exhaust gas from a pellet feeding passage side to an outside  
13 of the injection molding apparatus; and



U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

14 a device for preventing the moisture and the exhaust gas which pass  
15 through the exhaust gas passage from contacting the resin pellets passing  
16 through the pellet feeding passage.

1 Claim 13 (currently amended): A resin pellet feeding unit comprising:  
2 a resin pellet feeding passage for feeding resin pellets into an injection  
3 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
4 injection molding apparatus at a location spaced apart from where the mouth  
5 feeds the at least air into the injection molding apparatus;

6 a pellet feeding regulator for controlling a feed of the resin pellets form the  
7 resin pellet feeding passage into the injection molding apparatus;

8 an exhaust gas passage for passing moisture and exhaust gas which are  
9 generated when the resin pellets melt in the injection molding apparatus;

10 a decompressor connected t to the exhaust gas passage for exhausting the  
11 moisture and the exhaust gas from a pellet feeding passage side to an outside  
12 of the injection molding apparatus; and

13 a detector for detecting an accumulation amount of the resin pellets  
14 deposited in the injection molding apparatus, the detector disposed inside a  
15 cylinder of the injection molding apparatus.

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

1 Claim 14 (previously presented): A resin pellet feeding unit comprising:

2 a device for automatically feeding pellets with a vacuum interception valve,

3 the device and the valve being disposed to intercept a passage between a pellet

4 storage tank and other pellet storage;

5 a resin pellet feeding passage for feeding resin pellets into an injection  
6 molding apparatus;

7 a pellet feeding regulator for controlling a feed of the resin pellets from the  
8 resin pellet feeding passage into the injection molding apparatus;

9 an exhaust gas passage for passing moisture and exhaust gas which are  
10 generated when the resin pellets melt in the injection molding apparatus;

11 a decompressor connected to the exhaust gas passage for exhausting the  
12 moisture and the exhaust gas from a pellet feeding passage side to an outside  
13 of the injection molding apparatus; and

14 a removing apparatus placed at the exhaust gas passage.

1 Claim 15 (currently amended): A resin pellet feeding unit comprising:

2 a resin pellet feeding passage for feeding resin pellets into an injection  
3 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
4 injection molding apparatus at a location spaced apart from where the mouth  
5 feeds the at least air into the injection molding apparatus;

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

6 a pellet feeding regulator for controlling feed of the resin pellets from the  
7 resin pellet feeding passage into the injection molding apparatus;

8 an exhaust gas passage for passing moisture and exhaust gas which are  
9 generated when the resin pellets melt in the injection molding apparatus;

10 a decompressor connected to the exhaust gas passage for exhausting the  
11 moisture and the exhaust gas from a pellet feeding passage side to an outside  
12 of the injection molding apparatus;

13 a detector for detecting an accumulation amount of the resin pellets  
14 deposited in the injection molding apparatus, the detector disposed inside a  
15 cylinder of the injection molding apparatus;

16 a device for preventing the moisture and the exhaust gas which pass  
17 through the exhaust gas passage from contacting the resin pellets passing  
18 through the pellet feeding passage; and

19 a removing apparatus placed at the exhaust gas passage.

1 Claim 16 (original): A resin feeding unit of claim 13 or 15, wherein said  
2 detector is provided on said pellet feeder or a water jacket of the cylinder.

1 Claim 17 (original): A resin pellet feeding unit of claim 13 or 15, wherein  
2 said pellet feeder extends inside the cylinder.

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

1 Claim 18 (original): A resin pellet feeding unit of claim 16, wherein said  
2 detector is situated within about 10 mm from an upper end of a flight of a screw  
3 inside the cylinder.

1 Claim 19 (original): A resin pellet feeding unit of claim 11, 12 or 15,  
2 wherein said device for preventing contact is provided on the pellet feeder and  
3 the exhaust gas passage.

1 Claim 20 (original): A resin pellet feeding unit of claim 19, wherein said  
2 pellet feeder is made of copper.

1 Claim 21 (original): A resin pellet feeding unit of claim 14 or 15, wherein  
2 said removing apparatus is provided on the exhaust gas passage.

1 Claim 22 (currently amended): An injection molding process comprising the  
2 steps of:

3 feeding resin pellets to provide a given space between a location of an  
4 accumulation amount of the resin pellets inside of a cylinder and an inner wall  
5 of the cylinder of an injection molding apparatus;

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

6           feeding pellets into the injection molding apparatus at a location spaced  
7           apart from where a mouth feeds at least air into the injection molding apparatus;

8           and

9           exhausting, out of the cylinder, exhaust gas and moisture generated when  
10          the resin pellets melt in the cylinder as well as air fed from an opposite side to  
11          an nozzle of a front end of the cylinder from a pellet feeding side of a pellet  
12          feeding zone of the cylinder through a pellet exhaust gas passage by reducing  
13          pressure, of a predetermined decompression degree, inside of the cylinder  
14          through continuous driving of a vacuum pump which acts as a decompression  
15          during operation of the injection molding apparatus.

1           Claim 23 (currently amended) An injection molding process comprising the  
2          steps of:

3           feeding resin pellets to provide a given space between a location of an  
4          accumulation amount of the resin pellets inside of a cylinder and an inner wall  
5          of the cylinder of an injection molding apparatus, the feeding of the resin pellets  
6          being carried out without contacting exhaust gas and moisture generated when  
7          the pellets are melted inside of the cylinder;

8           feeding pellets into the injection molding apparatus at a location spaced  
9           apart from where a mouth feeds at least air into the injection molding apparatus;

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

10 and

11 exhausting, out of the cylinder, exhaust gas and moisture generated when  
12 the resin pellets melt in the cylinder as well as air fed from an opposite side to  
13 a nozzle of a front end of the cylinder from a pellet feeding side of a pellet  
14 feeding zone of the cylinder through a pellet exhaust gas passage by reducing  
15 pressure inside of the cylinder through driving of a vacuum pump which acts as  
16 a decompression.

1 Claim 24 (currently amended): An injection molding process comprising the  
2 steps of:

3 feeding resin pellets to provide a given space between a location of  
4 accumulation amount of the resin pellets inside of a cylinder and an inner wall  
5 of the cylinder of an injection molding apparatus;

6 feeding pellets into the injection molding apparatus at a location spaced  
7 apart from where a mouth feeds at least air into the injection molding apparatus;

8 and

9 exhausting, out of the cylinder, exhaust gas and moisture generated when  
10 the resin pellets melt in the cylinder as well as air fed from an opposite side to  
11 a nozzle of a front end of the cylinder from a pellet feeding side of a pellet  
12 feeding zone of the cylinder through a pellet exhaust gas passage by reducing

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

13 pressure, of the predetermined decompression degree, inside of the cylinder  
14 through continuous driving of a vacuum pump which acts as a decompression  
15 during operation of the injection molding apparatus.

1 Claim 25 (currently amended): An injection molding process comprising  
2 the steps of:

3 feeding resin pellets to provide a given space between a location of  
4 accumulation amount of the resin pellets inside of a cylinder and an inner wall  
5 of the cylinder of an injection molding apparatus;

6 feeding pellets into the injection molding apparatus at a location spaced  
7 apart from where a mouth feeds at least air into the injection molding apparatus;  
8 and

9 exhausting, out of the cylinder, exhaust gas and moisture generated when  
10 the resin pellets melt in the cylinder as well as air fed from an opposite side to  
11 a nozzle of a front end of the cylinder from a pellet feeding side of a pellet  
12 feeding zone of the cylinder through a pellet exhaust gas passage by reducing  
13 pressure, of the predetermined decompression degree, inside of the cylinder  
14 through continuous driving of a vacuum  
15 pump which acts as a decompression during operation of the injection molding  
16 apparatus; and

U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

17 detecting a location of the accumulation amount of the resin pellets to  
18 control the feeding of the resin pellets based on the detection information.

1 Claim 26 (previously presented): An injection molding process of claim 22,  
2 23, 24 or 25, wherein a degree of decompression is set at 40 Kpa (about 300  
3 Torr) or more.

1 Claim 27 (original): The injection molding process of claim 26, wherein the  
2 degree of decompression is about 70 Kpa or more.

1 Claim 28 (original): the injection molding process of claim 26, wherein the  
2 degree of decompression is about 80 Kpa to 95 Kpa.

1 Claim 29 (previously presented): An injection molding system comprising:  
2 an injection molding apparatus injecting melted resin into a die, the die  
3 being placed forward of one end of the injection molding apparatus;  
4 an air feeder for feeding at least air into the injection molding apparatus  
5 through a mouth arranged at an end of the injection molding apparatus opposite  
6 to the one end of the injection molding apparatus;  
7 a resin pellet feeding passage for feeding resin pellets into the injection



U.S. Patent Application Serial No. 09/988,499  
Amendment dated July 21, 2004  
Office Action dated April 21, 2004

8 molding apparatus, the resin pellet feeding passage feeding the pellets into the  
9 injection molding apparatus at a location spaced apart from where the mouth  
10 feeds the at least air into the injection molding apparatus;

11 a pellet feeding regulator for controlling a feed of the resin pellets from the  
12 resin pellet feeding passage into the injection molding apparatus;

13 a pellet exhaust gas passage for passing moisture and exhaust gas which  
14 are generated when the resin pellets melt in the injection molding apparatus;

15 a decompressor connected to the exhaust gas passage for exhausting the  
16 moisture and the exhaust gas from a pellet feeding passage side to an outside  
17 of the injection molding apparatus; and

18 a device for preventing the moisture and the exhaust gas which pass  
19 through the gas exhaust passage from contacting the resin pellets passing  
20 through the pellet feeding passage, with the moisture and the exhaust gas  
21 passing through a space outside the pellet feeder,

22 wherein the degree of decompression of said decompressor is at least one  
23 selected from among about 40Kpa (300 torr) or more, about 70 Kpa or more,  
24 and about 80 Kpa to 95 Kpa.

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